

Worked Example



B

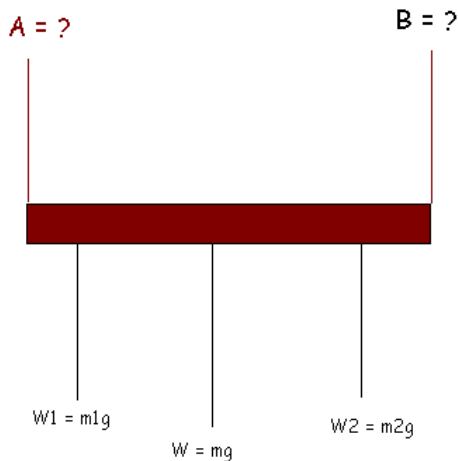
Bob **A** = 2 meters in length 10 kg

Bob = 97kg 50cm away from B

Bucket and Brush = 3kg 50cm away from A

Assume $g = 10\text{ms}^{-2}$

Force Diagram – Think about it



$$\text{Up forces} = F_A + F_B$$

$$\text{Down forces} = w_1 + w + w_2$$

$$\text{Up} = \text{Down}$$

$$F_A + F_B = w_1 + w + w_2$$

Torques

Around point "A" - random point

$T_c = F \times D$ (d = distance from point chosen e.g. A)

$$T_c = w_1 d_1 + w d_2 + W_2 d_3$$

$$T_c = 30 \times 0.5 + 100 \times 1 + 970 \times 1.5$$

$$T_c = 15 + 100 + 1455$$

$$T_c = 1570 \text{ Nm}$$

$$T_c = T_A$$

$$1570 = F_B \times 2$$

$$1570/2 = F_B$$

$$\underline{785 \text{ N} = F_B}$$

Sum of forces = 0

$$F_a + F_B = w_1 + w + W_2$$

$$F_a + 785 = 30 + 100 + 970$$

$$F_a + 785 = 1100$$

$$F_a = 1100 - 785$$

$$F_a = 315 \text{ N}$$